

**Voluntary Advisory Committee and Steering  
Committee Meeting  
Greenfields Bench SMP  
November 29, 2007**

**2007 Results Brief**

**Ground Water:** Collected samples from 8 wells on July 16 and September 17 for a total of 16 groundwater samples (see attached map for locations).

- **Imazamethabenz (Assert) and degradate:** all 16 groundwater samples had detections of imazamethabenz and its degradate. Imazamethabenz concentrations ranged from 0.02-0.59 ppb and the imazamethabenz metabolite concentrations ranged from 0.029-0.42 ppb.  
Drinking water standard for imazamethabenz is 400 ppb.
- **Tralkoxydim (Achieve) and degradate:** 13 of 16 groundwater samples and 7 of 8 sampling sites had detections of tralkoxydim; 6 of 16 samples and 4 of 8 sampling sites had detections of the tralkoxydim degradate. Where detected tralkoxydim concentrations ranged from Q (<0.0051)-0.014 ppb and the degradate concentrations ranged from Q (<0.005)-0.02 ppb.  
Drinking water standard for tralkoxydim is 20 ppb.
- **Pinoxaden (Axial) and degradates:** Pinoxaden was not detected in any of the 16 groundwater samples. The two pinoxaden degradates (NOA 407854 and NOA 447204) were detected in all 16 samples. Pinoxaden degradate concentrations ranged from Q (<0.01)-0.44 ppb.  
Pinoxaden has no drinking water standard at this time.
- **Nitrate:** Nitrate was detected in all 16 groundwater samples. Nitrate concentrations ranged from 3.2–9.4 parts per million (ppm). None of the nitrate concentrations exceeded the drinking water standard of 10 ppm; 6 of 16 nitrate concentrations exceeded 50% of the drinking water standard (38%).  
Drinking water standard for nitrate is 10 ppm.

**Surface Water:** Collected surface water samples from 5 sites on July 16 and on September 17 for a total of 10 samples (see attached map for locations).

- **Imazamethabenz (Assert) & degradate:** all 10 surface water samples had detections of imazamethabenz and its degradate. Concentrations of imazamethabenz ranged from 0.0019-0.16 ppb and the imazamethabenz degradate concentrations ranged from Q (<0.0052)-0.42 ppb. Drinking water standard for imazamethabenz is 400 ppb.
- **Tralkoxydim (Achieve) & degradate:** 9 of 10 surface water samples from all 5 sampling sites had detections of tralkoxydim; the tralkoxydim degradate was detected in 9 of 10 samples from all 5 sites. Where detected, concentrations of tralkoxydim ranged from Q (<0.0051)-0.00088 ppb and the tralkoxydim metabolite concentrations ranged from Q (<0.005)-0.007 ppb. Drinking water standard for tralkoxydim is 20 ppb.
- **Pinoxaden (Axial) & degradates:** Pinoxaden was not detected in any of the surface water samples. Pinoxaden degradates were detected in all 10 surface water samples. Pinoxaden metabolite concentrations ranged from Q (<0.01)-0.084 ppb. Pinoxaden has no drinking water standard at this time.
- **Nitrate:** Nitrate was detected in 9 of 10 surface water samples. Where detected nitrate concentrations ranged from 1.5-3.1 ppm. Drinking water standard for nitrate is 10 ppm.

**Other Pesticide Detections:** 22 pesticides other than imazamethabenz, tralkoxydim, and pinoxaden were detected in water samples from the Greenfields Bench. All pesticide concentrations were low and well below the drinking water standards where such standards exist.

<b>Summary of Other Pesticides Detected in Water Samples from the Greenfields Bench - 2007</b>			
Analyte	Number of Detections (# of sites)	Range of Concentrations (ppb)	Drinking Water Standard (ppb)
2,4-D	9 (7)	<0.0045-0.15	70
Atrazine	2 (2)	<0.0022	3
Deethyl Atrazine	1 (1)	<0.0017	--
Azoxystrobin	12 (7)	<0.0011-0.011	--
Bentazon	4 (4)	<0.0011-0.0033	200
Bromacil	2 (1)	2.2-4.6	90
Chlorsulfuron	0	--	1,750
Clopyralid	14 (9)	<0.022-0.36	3,500
Diruon	2 (1)	0.065-0.22	10
Hexazinone	4 (3)	<0.0059-0.052	400
Imazamox	3 (2)	0.012-0.026	--
Imazapyr	2 (1)	<0.011-0.014	21,000
Imidicloprid	6 (4)	<0.0018	--
MCPA	4 ** (4)	<0.0023-0.041	4
MCPP*	2 (2)	<0.0022	7
Metalaxyl	0	--	420
Malathion	2 (1)	0.099-0.26	100
Picoloram	1 (1)	<0.14	500
Prometon	11 (6)	<0.0051-0.029	100
Simazine	2 (1)	0.0059-0.0067	4
Tebuthiuron	11 (7)	<0.0011-0.31	500
Triasulfuron	16 (10)	<0.026-0.22	500
Triticonazole	0	--	--

\* Not previously detected in samples from the Greenfields Bench  
\*\* All detections were in surface water samples

**Summary of Assert (Imazamethabenz), Achieve (Tralkoxydim), and Axial (Pinoxaden) Detections  
Greenfields Bench - 2007**

<b>Site ID</b>	<b>Date</b>	<b>Stream Discharge (cfs)</b>	<b>Assert (Imazamethabenz) (ppb)</b>	<b>Assert Degrade (ppb)</b>	<b>Assert Drinking Water Standard (ppb)</b>	<b>Achieve (Tralkoxydim) (ppb)</b>	<b>Achieve Degrade (ppb)</b>	<b>Achieve Drinking Water Standard (ppb)</b>	<b>Axial (Pinoxaden) (ppb)</b>	<b>Axial Degrade NOA 407854 (ppb)</b>	<b>Axial Degrdate NOA 447204 (ppb)</b>
F-1	7/16/2007	--	0.1	0.088	400	Q (<0.0051)	ND	20	ND	0.44	0.07
	9/17/2007	--	0.076	0.073	400	ND	ND	20	ND	0.21	0.046
PWS-2	7/16/2007	--	0.59	0.1	400	0.0063	Q (<0.005)	20	ND	0.11	0.018
	9/17/2007	--	0.51	0.093	400	ND	ND	20	ND	0.14	0.046
G-9	7/16/2007	--	0.21	0.094	400	0.0075	Q (<0.005)	20	ND	0.16	0.055
	9/17/2007	--	0.15	0.047	400	Q (<0.0051)	ND	20	ND	0.12	0.013
G-10	7/16/2007	--	0.11	0.044	400	0.0061	Q (<0.005)	20	ND	0.12	0.078
	9/17/2007	--	0.077	0.093	400	0.0076	0.005	20	ND	0.13	0.013
G-11	7/16/2007	--	0.49	0.42	400	0.014	0.02	20	ND	0.23	0.025
	9/17/2007	--	0.35	0.27	400	0.0053	0.0078	20	ND	0.17	0.015
G-14	7/16/2007	--	0.22	0.12	400	Q (<0.0051)	ND	20	ND	0.01	0.019
	9/17/2007	--	0.11	0.071	400	ND	ND	20	ND	0.0072	Q (<0.01)
G-15	7/16/2007	--	0.034	0.041	400	ND	ND	20	ND	0.016	Q (<0.01)
	9/17/2007	--	0.02	0.029	400	ND	ND	20	ND	0.044	Q (<0.01)
FUS-10	7/16/2007	--	0.16	0.089	400	ND	ND	20	ND	0.19	0.2
	9/17/2007	--	0.044	0.029	400	ND	ND	20	ND	0.043	0.017
S-2	7/17/2007	7.27	0.0019	Q (<0.0052)	400	ND	ND	20	ND	Q (<0.0052)	ND
	9/18/2007	1.19	0.015	0.028	400	0.0054	Q (<0.005)	20	ND	0.041	Q (<0.01)
S-4	7/17/2007	25.72	0.052	0.041	400	0.0062	0.0059	20	ND	0.038	0.033
	9/18/2007	3.68	0.058	0.078	400	0.007	0.007	20	ND	0.072	0.012
S-6	7/17/2007	15.57	0.16	0.12	400	0.0068	Q (<0.005)	20	ND	0.042	0.032
	9/17/2007	2.59	0.078	0.09	400	0.0088	Q (<0.005)	20	ND	0.084	Q (<0.01)
S-7	7/16/2007		0.035	0.046	400	Q (<0.0051)	ND	20	ND	0.015	Q (<0.01)
	9/17/2007		0.042	0.067	400	Q (<0.0051)	Q (<0.005)	20	ND	0.036	Q (<0.01)
S-8	7/16/2007		0.045	0.075	400	Q (<0.0051)	Q (<0.005)	20	ND	0.023	Q (<0.01)
	9/17/2007		0.038	0.096	400	Q (<0.0051)	Q (<0.005)	20	ND	0.039	Q (<0.01)

cfs = cubic feet per second; ppb = parts per billion; ND = not detected above analytical method detection limit; Q = analyte detected below analytical method reporting limit and therefore not quantified

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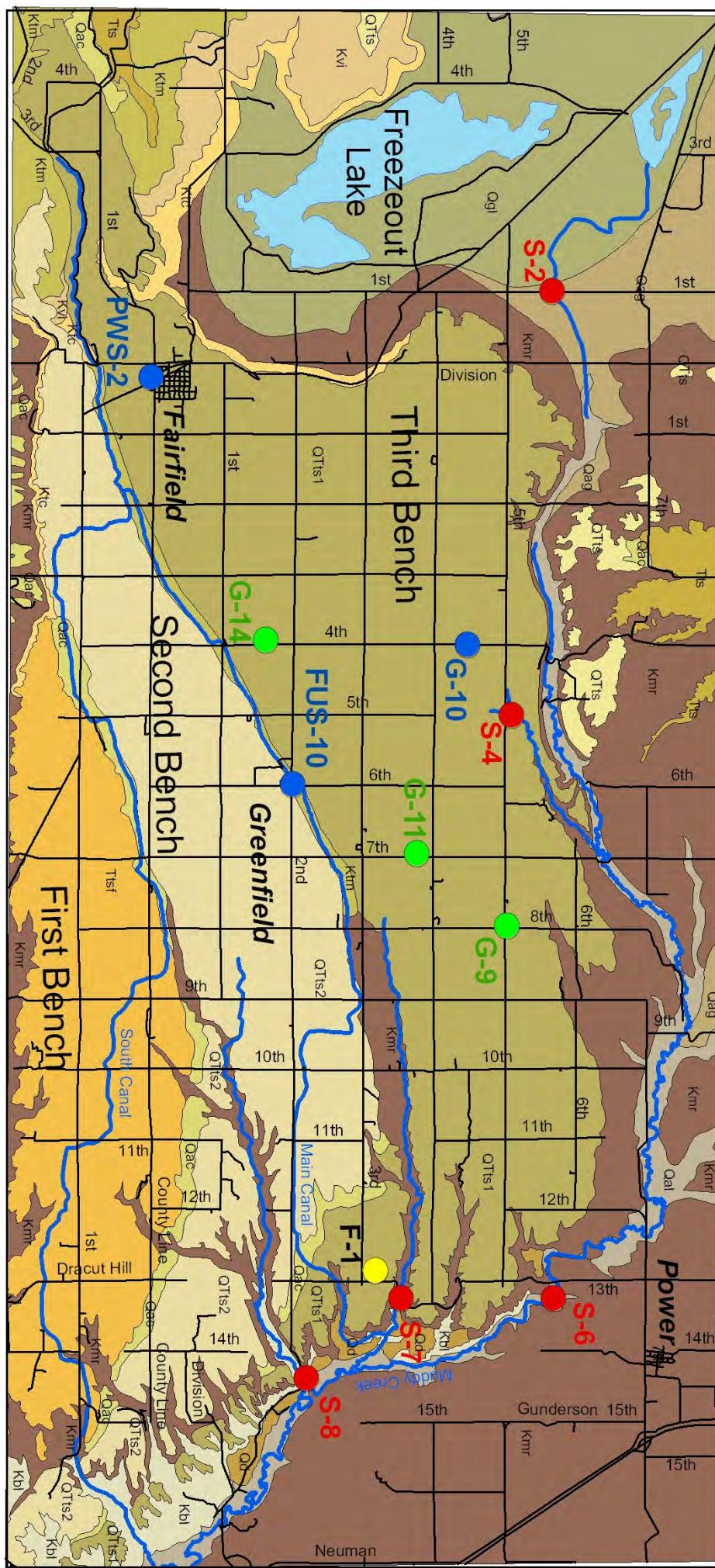
***Summary of Nitrate Detections***  
***Greenfields Bench 2007***

<b><i>Site ID</i></b>	<b><i>Date</i></b>	<b><i>Analyte</i></b>	<b><i>Concentration (ppm)</i></b>	<b><i>Drinking Water Standard (ppm)</i></b>
<b><i>F-1</i></b>	7/16/2007	Nitrate	8.8	10
	9/17/2007	Nitrate	7.1	
<b><i>PWS-2</i></b>	7/16/2007	Nitrate	4.6	
	9/17/2007	Nitrate	4.8	
<b><i>G-9</i></b>	7/16/2007	Nitrate	4.4	
	9/17/2007	Nitrate	4.9	
<b><i>G-10</i></b>	7/16/2007	Nitrate	4.4	
	9/17/2007	Nitrate	4.8	
<b><i>G-11</i></b>	7/16/2007	Nitrate	9.4	
	9/17/2007	Nitrate	6.9	
<b><i>G-14</i></b>	7/16/2007	Nitrate	5.1	
	9/17/2007	Nitrate	3.2	
<b><i>G-15</i></b>	7/16/2007	Nitrate	5.0	
	9/17/2007	Nitrate	4.7	
<b><i>FUS-10</i></b>	7/16/2007	Nitrate	4.5	
	9/17/2007	Nitrate	4.2	
<b><i>S-2</i></b>	7/17/2007	Nitrate	N.D.	
	9/18/2007	Nitrate	1.8	
<b><i>S-4</i></b>	7/17/2007	Nitrate	1.8	
	9/18/2007	Nitrate	4.3	
<b><i>S-6</i></b>	7/17/2007	Nitrate	1.9	
	9/17/2007	Nitrate	3.1	
<b><i>S-7</i></b>	7/16/2007	Nitrate	1.6	
	9/17/2007	Nitrate	1.9	
<b><i>S-8</i></b>	7/16/2007	Nitrate	1.5	
	9/17/2007	Nitrate	1.6	

ppm = parts per million (mg/L); ND = not detected above analytical method reporting limit

Nitrate detected in 16 of 16 groundwater samples (100%). Nitrate exceeded 50% of the drinking water standard in 6 of 16 groundwater samples (38%) but none of the concentrations exceeded the drinking water standard. Nitrate detected in 9 of 10 surface water samples (90%). None of the nitrate concentrations in surface water exceeded 50% of the drinking water standard.

## 2007 Sampling Locations - Greenfields Bench



## Types of Sampling Sites

- Permanent Monitoring Well  
● Public Water Supply Well  
● Domestic Well



0 1 2 3 4 Miles



## Geologic Units

- |                                                                  |  |
|------------------------------------------------------------------|--|
| Kb1 - Blackleaf Formation                                        |  |
| Kv1 - Marias River Formation                                     |  |
| Km1 - Two Medicine Formation                                     |  |
| Kv1 - Virgelle Formation                                         |  |
| OTs - Terrace Sediment, prim. gravel, not corr. with OT          |  |
| OTs1 - Terrace Sediment, 3rd Greenfield Bench, prim. gravel      |  |
| OTs2 - Terrace Sediment, 2nd Greenfield Bench, prim. gravel      |  |
| Osc - Alluvium/Colluvium                                         |  |
| Oag - Alluvium/glacial deposits, undivided                       |  |
| Oal - Alluvium                                                   |  |
| Qd - Delta deposits of glacial lake                              |  |
| Qgl - Glacial lake Great Falls Deposit                           |  |
| Tts - Terrace Sediment, prim. gravel, not corr. w/ other T units |  |
| Tsf - Terrace Sediment, 1st Greenfield Bench, prim. gravel       |  |

**Disclaimer:** Some of the datasets in this map document may contain references (or pointers) to information created and maintained by other organizations. Please note that the Montana Department of Agriculture does not control and cannot guarantee